



Mr. James Saric USEPA Region 5 77 West Jackson Boulevard (SR-6J) Chicago, IL 60604-3507

Mr. Michael Ribordy USEPA Region 5 77 West Jackson Boulevard (SE-5J) Chicago, IL 60604-3590

Subject:

Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site Time-Critical Removal Action – Former Plainwell Impoundment Groundwater Monitoring Well Installation Plan

Dear Jim and Mike:

In accordance with the approved Time-Critical Removal Action Design Report (Design Report) (2007) and the Area 1 Supplemental Remediation and Feasibility Study (SRI/FS) Work Plan (2007), ARCADIS is proposing to install fifteen groundwater monitoring wells at the former Plainwell Impoundment in Allegan County, Michigan. This letter provides details regarding the proposed well installation program to facilitate coordination with agency oversight personnel. Attached please find information regarding the proposed well installation activity, including a well location map, groundwater and surface water elevation data, and logs of pilot borings drilled at the fifteen locations in which the wells are to be installed. Also shown on the logs are preliminary construction specifications for each monitoring well.

The proposed well construction specifications were prepared based on the objectives of the monitoring program stated in the Design Report to evaluate the potential presence of PCBs in groundwater and assess the migration of PCBs (if any) to the river, as well as the observed geology and water elevations. The recent water elevation data and field observations suggest that surface water and groundwater elevations are at present relatively high due to snow-melt flows and the remaining transient effect of the mid-channel prism. As discussed in the Design Report, groundwater and surface water levels near the former dam are also expected to be up to a foot higher on average than they ultimately will be once the mid-channel

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SEDIMENTS

Date:

February 25, 2009

Contact

Steve Garbaciak

Phone:

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Steve.Garbaciak@ arcadis-us.com

Our ref: B0064530.0000.00675

## **ARCADIS**

Mssrs. James Saric and Michael Ribordy February 25, 2009

prism is fully eroded away, which is anticipated to occur from one to five years after the dam removal activities are completed. These factors will be considered in establishing final well screen elevations upon installation in the field. Those determinations will be guided by the well construction plan shown on the boring logs, but also observed field conditions at the time of installation.

Staff gages will be installed in conjunction with the groundwater well installation at the SG-1, SG-3, and SG-4 locations shown on the well location map. All top of well elevations and the staff gages will be surveyed into the National Geodetic Vertical Datum 29 and the North American Datum of 1983 horizontal datum at a precision of 0.2 ft.

It is our intent to mobilize to the site and begin the drilling and well installation program on March 2. We anticipate well development will occur during the week of March 22, followed by collection of the first groundwater samples during the week of March 30. If you have any questions or wish to discuss the well installation program further, please contact Doug Cowin of ARCADIS (312.332.4937x11), who will be coordinating this activity, or me, at your convenience.

Sincerely,

**ARCADIS** 

Stephen Garbaciak Jr., P.E.

Vice President

Copies:

Samuel Borries, USEPA Paul Bucholtz, MDEQ

Jeff Keiser, CH2M Hill

J. Michael Davis, Esq., Georgia-Pacific LLC

Gary Griffith, Georgia-Pacific LLC

L. Chase Fortenberry, P.E., Georgia-Pacific LLC

Michael Erickson, P.E., ARCADIS

DKC/dkc

## Table 1. Groundwater and Surface Water Elevation Data Time Critical Removal Action Former Plainwell Impoundment Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site

		PZ-1				PZ-5		
Date	PZ-1	Groundwater Elevation	SG-1	SG-2	PZ-5	Groundwater Elevation	SG-5	Comments
11/21/08	9.60	701.70	702.25	702.16	10.38	703.52	703.42	SG-1 is currently behind an enclosed sheetpile wall
11/22/08	9.52	701.78	702.25	702.10	10.36	703.54	703.35	SG-1 is currently behind an enclosed sheetpile wall
11/24/08	9.69	701.61	702.25	702.06	10.55	703.35	703.30	SG-1 is currently behind an enclosed sheetpile wall
11/26/08	9.75	701.55	701.75	701.95	10.70	703.20	703.12	SG-1 is currently behind an enclosed sheetpile wall
12/01/08	9.85	701.45	701.55	701.46	10.84	703.06	703.11	SG-1 is currently behind an enclosed sheetpile wall
12/02/08	9.85	701.45	701.55	701.45	10.85	703.05	703.10	SG-1 is currently behind an enclosed sheetpile wall
12/15/08	9.29	702.01	NA	702.70	10.26	703.64	703.76	SG-1 was destroyed; no further readings
12/16/08	9.26	702.04	NA	702.68	10.25	703.65	703.73	SG-1 was destroyed; no further readings
12/17/08	9.29	702.01	NA	702.80	10.10	703.80	703.90	SG-1 was destroyed; no further readings
12/20/08	9.20	702.10	NA	NA	10.45	703.45	NA	SG-2 and SG-5 are frozen and unreadable
12/23/08	9.55	701.75	NA	NA	10.59	703.31	. NA	SG-2 and SG-5 are frozen and unreadable
12/29/08	8.01	703.29	NA	NA	8.93	704.97	NA	SG-2 and SG-5 are underwater
12/30/08	8.06	703.24	NA	NA	8.97	704.93	NA	SG-2 and SG-5 are underwater
12/31/08	7.81	703.49	NA	NA	8.50	705.40	NA	SG-2 and SG-5 are underwater
01/02/09	7.66	703.64	NA	NA	8.42	705.48	NA	SG-2 and SG-5 are underwater
02/17/09	8.59	702.71	NA	NA	9.88	704.02	703.75	SG-2 was displaced by ice; no further readings
02/20/09	8.96	702.34	NA	NA	10.25	703.65	703.43	SG-2 was displaced by ice; no further readings

## Notes:

PZ = piezometer

SG = staff gage NA = not available (no data collected, see comments for explanations)

Piezometer readings are taken from the top of PVC

SG-4 was not used for comparison of water elevations at PZ-1 because it was enclosed by a coffer dam during the time of monitoring.

Date Start/Finish: 11/13/2008 Drilling Company: MATECO

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger Auger Size: 4.25" ID

Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: 350957.1 Easting: 12772453.2 Casing Elevation: NA

Borehole Depth: 24' bgs Surface Elevation: 708.0 ft AMSL

Descriptions By: Ron Kuhn

Well/Boring ID: MW-01 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	710 —									Locking J-Plug  Steel Protective Casing
0	_	1	0-2	1.2	4 4 3 2	7	NA	<del>‡.T.</del> =	Gray-brown Silty fine SAND, trace medium to coarse Sand, trace fine Gravel (road base).  Orange-brown Silty fine SAND, trace medium to coarse Sand, trace fine to medium Gravel, dry.	ONONO.
	705 —	2	2-4	1.0	2 2 2 3	4	NA	 	Gray-brown Silty CLAY, trace Organics, damp.	Proposed bentonite grout to 4.5' bgs Proposed doubl casing 0 to 5' bgs Proposed 2" ID
5	_	3	4-6	0.0	2 2 2 2	4	NA		No recovery using either 2" and 3" split spoon.	Type 304 Stainless Steel riser 2' ags to 7' bgs Proposed bentonite seal
	700 -	4	6-8	1.2	WOH 2 3 5	5	NA.	 	Dark brown organic Clayey SILT, little fine Sand, moist.  Gray-brown fine SAND, trace Silt, loose, saturated.	4.5 to 6.5' bgs
10	-	5	8-10	0.8	3 5 8 10	13	NA		Olive-brown fine to medium GRAVEL, little fine Sand, trace medium to coarse Sand, trace Silt, saturated.	
10	-	6	10-12	0.4	5 8 12 9	20	NA	O O O O O	Gray-brown fine to medium GRAVEL, trace fine to coarse Sand, saturated.	Proposed grade
	695 –	7	12-14	0.7	10 8 5	13	NA	00000	Dark gray fine to coarse SAND and fine to medium GRAVEL, saturated.	#5 "Global Filte Pack" silica san pack 6.5 to 17' bgs Proposed 2" ID Type 304
15	-	8	14-16	0.3	5 5 8 8	13	NA	000000		Stainless Steel 0.010" slotted screen 7 to 17' bgs



Site Location: Plainwell, Michigan Well/Boring ID: MW-01 Proposed

Borehole Depth: 24' bgs

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	9	16-18	0.3	2 5 2 5	7	NA	000000000000000000000000000000000000000	Dark gray fine to medium GRAVEL, trace fine to coarse Sand, saturated.	
- 690 - 	10	18-20	0.6	2 3 5 5	8	NA	00000		
_	11	20-22	0.0	5 7 8 11	15	NA		No recovery.	
- 685 -	12	22-24	0.5	7 7 7 7	14	NA	100000 10000	Gray-brown fine to medium GRAVEL, little fine to coarse Sand, trace Silt, loose, saturated.	
- 25									
- 30 - 675 -									
- 35 -			# 1.					Remarks: ans = above ground surface; bus = below ground	



Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; WOH = Weight of Hammer.

Date Start/Finish: 11/13/2008 **Drilling Company: MATECO** 

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger Auger Size: 4.25" ID

Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: NA

Easting: NA
Casing Elevation: NA

Borehole Depth: 20' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-02 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

DEPTH	ELEVATION Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
-	-								Locking J-Plug  Steel Protective Casing
-	1	0-2	2.0	1 1 1 1	2	NA	 	Dark gray-brown Silty CLAY, trace intermittent fine Sand laminations, trace Organics, moist.	Proposed bentonite grout 0 to 1.5' bgs  Proposed double casing 0 to 2.9' bgs
	- 2	2-4	1.7	2 1 1 2	2	NA	⊥ ••• •••	Olive-brown fine SAND, trace Silt, saturated.  Light gray-brown fine SAND, trace Silt, trace Shells, saturated.	Proposed bentonite seal 1.5 to 3.5' bgs Proposed 2" ID Type 304
_5 -5	5- 3	4-6	1.0	5 9 13	22	NA		Light gray-brown fine to medium SAND, little coarse Sand, little fine to medium Gravel, trace Silt, loose, saturated.	Stainless Steel riser 2' ags to 4' bgs
-	- 4	6-8	0.7	5 9 11	20	NA			
	- 5	8-10	0.4	10 4 2 2	6	NA	000000	Dark gray fine to medium GRAVEL, little fine to coarse Sand, trace Silt, saturated.	Proposed grade #5 "Global Filter Pack" silica sand pack 3.5 to 14' bgs
-10 -16	- 6	10-12	0.2	3 3 5	8	NA			
	7	12-14	0.4	12 12 8 7	20	NA		Gray-brown fine to coarse SAND, little fine to medium Gravel, trace Silt, saturated.	Proposed 2" ID Type 304
15 -15	5 - 8	14-16	1.5	7 7 7 7	14	NA		Light gray-brown fine to medium SAND, trace coarse Sand, trace fine to medium Gravel, trace Silt, saturated.	Stainless Steel 0.010" slotted screen 4 to 14' bgs



Well/Boring ID: MW-02 Proposed

Borehole Depth: 20' bgs

Site Location:

Plainwell, Michigan

				_						
DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		0,	-		7				As above, grading to light gray-brown fine to medium SAND, trace Silt,	
	-	9	16-18	1.0	10 12 16	22	NA		As above, grading to light gray-brown fine to medium SAND, trace Silt, saturated. Gradation change at ~16.5' bgs.	
					7				Light gray-brown fine to medium SAND, trace fine Gravel, trace Silt, saturated.	
- 20	20	10	18-20	0.8	8 10 10	18	NA		,	
7 20	20									
-										
-	-									
-	_									
- 25	-25 -									
-										
-	-									
-	-									
	_									
30	-30 -							11		
- 30	50									
-	-									
-	-									
-	-									
<b>—</b> 35	-35 <b>–</b>									



**Remarks:** ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Date Start/Finish: 11/14/2008 **Drilling Company: MATECO** 

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger

Auger Size: 4.25" ID Rig Type: CME-55

Sampling Method: 3" x 2' Split Spoon

Northing: NA Easting: NA Casing Elevation: NA

Borehole Depth: 23' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-03 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

DEPTH	Sample Rin Nimber	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
									Locking J-Plug Steel Protective Casing
0	-	IA 0-	s NA	NA	NA	NA		No Sampling - continuous auger to 3' bgs through 22A stone.	Proposed bentonite grout to 4' bgs Proposed doub casing 0 to 5' bgs
	-	1 3-	0.9	2 2 2 2	4	NA		Dark brown TOP SOIL.  Gray-brown Silty CLAY, trace Organics, moist.	Proposed 2" ID Type 304 Stainless Steel riser 2' ags to 7 bgs
5 -3		2 5-	1.6	2 2 2 2	4	NA		Dark brown fine SAND, trace Silt, saturated.  Orange-brown fine SAND, trace Silt, saturated.	Proposed bentonite seal to 6' bgs
	-	3 7-9	1.3	2 4 7 9	11	NA		Orange-brown fine SAND, little Silt, trace medium to coarse Sand, trace fine to medium Gravel, saturated.	
10 -10		4 9-1	1 0.6	4 7 11 12	18	NA		Orange-brown Sitty fine SAND, little medium to coarse Sand, trace fine to coarse Gravel, saturated.  Orange-brown fine SAND, little medium to coarse Sand, trace fine to medium	
		5 11-	3 1.2	6 6 8	12	NA		Gray-brown fine to coarse SAND, trace fine to medium Gravel, loose, saturated.	Proposed grad #5 "Global Filte Pack" silica sar pack 6 to 17' bgs
15 <i>-15</i>		5 13- <sup>-</sup>	5 1.1	4 5 5 7	10	NA			Proposed 2" IC Type 304 Stainless Steel 0.010" slotted screen 7 to 17' bgs
-40	- 1	7 15-	7 1.0	6 9	21	NA		Gray-brown fine to medium SAND, little coarse Sand, trace fine to coarse Gravel, saturated.	

Infrastructure, environment, facilities

Site Location: Plainwell, Michigan Well/Boring ID: MW-03 Proposed

Borehole Depth: 23' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		7	15-17	1.0	12 20	21	NA		Gray-brown fine to medium SAND, little coarse Sand, trace fine to coarse Gravel, saturated.	
		8	17-19	1.3	4 5 8	13	NA		Gray-brown fine to coarse SAND, little fine to medium Gravel, loose, saturated.	
- 20	-20 -	9	19-21	1.2	6 9 11 13	20	NA		Light gray-brown fine SAND, trace Silt, saturated.	
					10 11				Gray-brown fine to medium SAND, little coarse Sand, saturated.	
		10	21-23	1.3	14 20	25	NA	0000	Gray-brown coarse SAND and fine to coarse GRAVEL, little fine to medium Sand, saturated.	
- 25	-25 -									
- 30	-30 -									
— 35 L	-35 -									



**Remarks:** ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level. Used 3" split spoon for all intervals.

Date Start/Finish: 11/13/2008

Drilling Company: MATECO
Driller's Name: Gary Swift, John Olson
Drilling Method: Hollow Stem Auger
Auger Size: 4.25" ID

Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: NA Easting: NA

Casing Elevation: NA

Borehole Depth: 22' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-04 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Bor Construc	
									100	Locking J-Plug     Steel Protective Casing
	1	0-2	NA	NA	NA	NA	0000	No sampling - continuous Hollow Stem Auger through 22A stone pad.	AC	<ul> <li>Proposed bentonite grout to 4' bgs</li> <li>Proposed doub</li> </ul>
	2	2-4	NA	NA	NA	NA				casing 0 to 5' bgs  — Proposed 2" ID Type 304 Stainless Steel riser 2' ags to 7 bgs
5 -5-	3	4-6	NA	NA	NA	NA				<ul> <li>Proposed bentonite seal to 6' bgs</li> </ul>
	4	6-8	1.5	WOH WOH 1	1	NA		Dark gray grading to dark gray-brown fine SAND, trace Silt, loose, wet.		
	5	8-10	0.6	2 2 3 3	5	NA		Light gray-brown fine to medium SAND, little coarse Sand, little fine to medium Gravel, trace Silt, little calcareous Silt/Sand-sized grains, saturated.		
10 -10-	6	10-12	0.5	1 1 1 1	2	NA		Light gray calcareous fine to medium SAND, little fine to medium Gravel, trace coarse Sand, trace Silt (calcareous), saturated.		<ul> <li>Proposed grad #5 "Global Filte</li> </ul>
	7	12-14	0.9	4 4 4	8	NA	0000	Brown fine to medium GRAVEL, trace fine to coarse Sand, trace Silt, saturated.		Pack" silica sa pack 6 to 17' bgs  — Proposed 2" IE
15 -15 -	8	14-16	0.7	6 4 4 10 6	14	NA	0000	Orange-brown Silty CLAY, moderately stiff, moist.  Orange-brown fine to coarse SAND and fine to medium GRAVEL, trace Silt, saturated.		Type 304 Stainless Stee 0.010" slotted screen 7 to 17' bgs

Infrastructure, environment, facilities

Site Location: Plainwell, Michigan Well/Boring ID: MW-04 Proposed

Borehole Depth: 22' bgs

DEРТН	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Well/Boring Stratigraphic Description Construction
					6			0-	Orange-brown fine to coarse SAND and fine to medium GRAVEL, trace Silt,
-	_		40.40	0.0	6		NIA		saturated.
		9	16-18	0.6	8	14	NA		Dark gray fine SAND, trace Silt, saturated.
-	-	-			11			-0-	Orange-brown fine to coarse SAND and fine to medium GRAVEL, trace Silt,
					15 9			000	saturated.
<b> </b>	-	10	18-20	0.5	7	16	NA	0	
20	-20 <b>-</b>				12			000	
-20	20				5			00	
-	_	11	20-22	0.3	5	13	NA	00	
					8 12			000	
1					12			0-	
	_								
-	-								
- 25	-25 -								
-	-								
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-30	-30 <b>-</b>								
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- 1	-				,				
-	-								
- 35	_3E								
- 33	-55 -								
	_								
4									



Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; WOH = Weight of Hammer.

Date Start/Finish: 11/14/2008 Drilling Company: MATECO

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger

Auger Size: 4.25" ID Rig Type: CME-55

Sampling Method: 3" x 2' Split Spoon

Northing: 350153.0 Easting: 12773460.8 Casing Elevation: NA

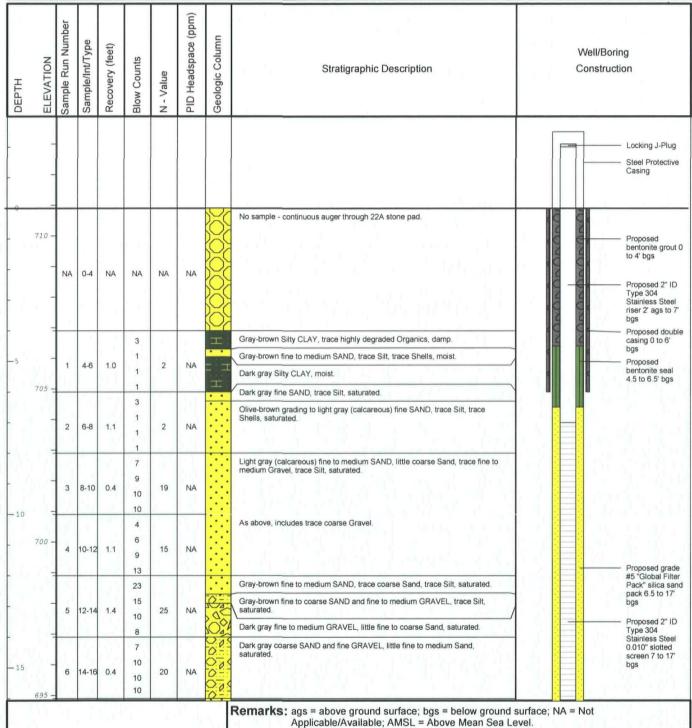
Borehole Depth: 22' bgs Surface Elevation: 710.9 ft AMSL

Descriptions By: Ron Kuhn

Well/Boring ID: MW-05 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan



Applicable/Available; AMSL = Above Mean Sea Level.

Tried 2" split spoon for 6-8' and 8-10' bgs intervals, no recovery using 2" spoon, so used 3" split spoon for remaining intervals.

Site Location: Plainwell, Michigan Well/Boring ID: MW-05 Proposed

Borehole Depth: 22' bgs

			_							
DEРТН	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	_		16-18	0.8	5 7 8 8	15	NA		Dark gray fine to coarse SAND, little fine to medium Gravel, saturated.	
20	-	8	18-20	0.6	6 7 6 6	13	NA	000000	Dark gray coarse SAND and fine GRAVEL, little fine to medium Sand, trace medium Gravel, saturated.	
- 20	690 —	9	20-22	0.0	6 9 9 9	18	NA		No recovery - likely same as above.	
- 25										
-	685 -									
- 30	-									
-	680 -									
-	-									
<b>-</b> 35	675 —									



Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Tried 2" split spoon for 6-8' and 8-10' bgs intervals, no recovery using 2" spoon, so used 3" split spoon for remaining intervals.

Date Start/Finish: 11/12/2008
Drilling Company: MATECO

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger

Auger Size: 4.25" ID Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: NA Easting: NA

Casing Elevation: NA

Borehole Depth: 24' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-06 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

							_			
рертн	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Well/Boring Stratigraphic Description Construction	
									Locking J-Plu Steel Protect Casing	
	_	1	0-2	2.0	1 2 2 2	4	NA	=	Gray Silty CLAY, trace Organics, damp.  Proposed bentonite gro to 4' bgs	
	_	2	2-4	2.0	2 2 2	4	NA	 	As above, grading to olive-brown in color at 3.3' bgs.  Proposed 2" Type 304 Stainless Ste riser 2' ags to bgs	eel
-5	-5-	3	4-6	0.8	2 4 5 7 5	12	NA	±	Olive-brown Silty CLAY, trace organics, moist.  Orange-brown fine SAND, trace medium Gravel, trace Silt, wet.  Proposed docasing 0 to 5' bgs  Proposed bentonite sea	5'
		4	6-8	1.2	9 1 1 1	2	NA		Orange-brown fine to medium SAND, trace Silt, saturated.	
		5	8-10	1.2	1 1 1 2	2	NA			
-10	-10 -	6	10-12	1.6	4 4 6	10	NA		Proposed gra #5 "Global Fi	ade
		7	12-14	1.2	10 6 6 9	15	NA		Pack' silica s pack 6 to 17' bgs  Proposed 2'' Type 304	sand
- 15	-15 —	8	14-16	2.0	10 6 7 9 10	16	NA		Gray-brown fine to coarse SAND and fine to medium GRAVEL, loose, saturated.	d
	S	2	AF	RC/	DI	S		<i>9-11</i>	Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.  Proposed well construction is shown for review.	

Infrastructure, environment, facilities

Site Location: Plainwell, Michigan Well/Boring ID: MW-06 Proposed

Borehole Depth: 24' bgs

Γ		Number	ype	et)			ce (ppm)	nmn		
DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
					1			000	Gray-brown fine to coarse SAND and fine to medium GRAVEL, loose, saturated.	
-	-	9	16-18	1.3	2 2 2	4	NA	000		
					1			000		
	1	10	18-20	0.7	2	4	NA	000		, ,
-20	-20 -				2			0=	Gray-brown fine to coarse SAND, little fine to medium Gravel, loose, saturated.	
-	-	11	20-22	0.9	2	6	NA			
-	_				5					
					3					
		12	22-24	1.3	4	7	NA			
- 25	-25 -									
-	-									
-	-									
-	-									
-	-									
-30	-30 -								×	
	+									
-	-									
- 35	-35 <b>-</b>									
				1					Pomoukou assa a shaka arsand surface, has a halou arsand	· ·



Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Date Start/Finish: 11/12/2008 **Drilling Company: MATECO** 

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger Auger Size: 4.25" ID

Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: NA Easting: NA Casing Elevation: NA

Borehole Depth: 16' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-07 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

DEРТН	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction	
-	-	S	0)		ш	2		0		Locking J-Plu  Steel Protect Casing	
	-	1	0-2	1.8	3 1 3 3	4	NA	Н : Н : Н	Gray-brown Silty CLAY, trace Organics (vegetation), damp.	Proposed bentonite gro to 3' bgs	
		2	2-4	1.5	2 2 2 2	4	NA	±	Dark brown fine SAND, trace Silt, loose, damp.  Orange-brown fine SAND, trace Silt, loose, damp.	casing 0 to 3 bgs  ———————————————————————————————————	ID eel
<b>-</b> 5	-5-	3	4-6	0.6	2 2 2 2	4	NA		As above, trace fine to medium Gravel, wet.	riser 2' ags to bgs Proposed bentonite sea	
	-	4	6-8	0.4	1 2 1	3	NA		Orange-brown Sitty fine to medium SAND, little coarse Sand, trace fine to coarse Gravel, loose, saturated.		
_ 10	-10 -	5	8-10	0.7	1 2 1	3	NA		As above, grading to orange-brown fine to coarse SAND, trace fine Gravel, trace Silt, loose, saturated.		
- 10	-10 -	6	10-12	1.1	2 2 3 3	5	NA		Orange-brown fine to coarse SAND, trace to little fine to medium Gravel, trace Silt, loose, saturated.	Proposed gra #5 "Global Fi Pack" silica s pack 5 to 16' bgs	ilter sand
-		7	12-14	0.7	2 2 3 4	5	NA		Gray-brown fine to coarse SAND, trace fine Gravel, trace Silt, loose, saturated.	Proposed 2" Type 304	
-15	-15 -	8	14-16	1.2	3 4 2 5	6	NA		Gray-brown fine to coarse SAND, trace to little fine to medium Gravel, trace Silt, loose, saturated.  Dark gray fine to medium GRAVEL, little fine to coarse Sand, trace Silt, loose, saturated.	Stainless Ste  0.010" slotted screen 6 to 1	d



Applicable/Available; AMSL = Above Mean Sea Level. Used 3" split spoon for 6-8' bgs interval, no recovery using 2" spoon.

Date Start/Finish: 11/12/2008

Drilling Company: MATECO
Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger Auger Size: 4.25" ID

Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: NA

Easting: NA
Casing Elevation: NA

Borehole Depth: 24' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-08 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
-									Locking J-Plug Steel Protectiv Casing
0 0	1	0-2	0.7	5 6 4 3	10	NA	000000	Orange-brown fine to medium GRAVEL, some fine Sand and Silt, trace medium to coarse Sand, trace Clay, dense, damp (access road material).	Proposed bentonite grou to 2' bgs Proposed 2" IC Type 304 Stainless Stee
	2	2-4	0.3	2 2 2 2	4	NA	00000	Dark gray Silty CLAY, trace Organics (Roots), damp.	riser 2' ags to bgs  Proposed dout casing 0 to 4' bgs  Proposed
5 -5-	3	4-6	0.9	2 2 3 3	5	NA		Orange-brown fine SAND, trace medium to coarse Sand, trace fine Gravel, trace Silt, moist.	bentonite seal to 4' bgs
	4	6-8	0.4	2 2 2 2	4	NA	4444444	Orange-brown Silty fine to coarse SAND, little fine to medium Gravel, loose, saturated.	
	5	8-10	0.9	1 1 4 6	5	NA	H 1000	Gray-brown fine SAND, trace medium to coarse Sand, trace Silt, saturated.  Gray Silty fine to medium GRAVEL.  Gray-brown fine to coarse SAND, little fine to medium Gravel, trace Silt,	Proposed grad
10 -10 =	6	10-12	0.9	14 10 3 3	13	NA		Gray-brown fine SAND, trace Silt, saturated.	Pack" silica sa pack 4 to 15' bgs
	7	12-14	1.0	1 4 5	9	NA		As above, grading to dark gray-brown fine to medium SAND, little coarse Sand, trace fine to medium Gravel, trace Silt, saturated, gradation change at ~12.5' bgs.  Gray-brown fine to medium SAND, trace coarse Sand, trace fine to medium	Proposed 2" IC Type 304
- 15 -15 -	8	14-16	0.6	2 4 7 9	11	NA	0000	Gravel, trace Silt, saturated.  Dark gray fine to medium GRAVEL, little fine to coarse Sand, trace Silt, loose, saturated.	Stainless Stee 0.010" slotted screen 5 to 15'

Site Location: Plainwell, Michigan Well/Boring ID: MW-08 Proposed

Borehole Depth: 24' bgs

DEРТН	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
					4				Dark gray fine to coarse SAND, little fine to medium Gravel, trace Silt, loose, saturated.	
_		9	16-18	0.9	6 11 9	17	NA			
Ī					4			0:	Dark gray fine to coarse SAND and fine to medium GRAVEL, trace Silt, loose, saturated.	
-		10	18-20	0.9	5 5 5	10	NA	00000	saturated.	
- 20	-20 -				2			00		
					2			0.00		_ =
	1	11	20-22	0.8	4	6	NA	000		
					7			0-		
	1				2			0.74	-	
					2			00000		
		12	22-24	0.3	3	5	NA			
1					4			0		
- 25	-25 -									
-	-									l e
-	-									
1	1									
-30	-30									
- 30	-30 -									
-	_									
-	-									
-	-									
- 35	-35 <b>-</b>									
										N 1
							-			



**Remarks:** ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Date Start/Finish: 11/17/2008 Drilling Company: MATECO

Driller's Name: Gary Swift, Rob Merlington
Drilling Method: Hollow Stem Auger

Auger Size: 4.25" ID Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: NA Easting: NA

Casing Elevation: NA

Borehole Depth: 26' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-09 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	-									Locking J-Plug  Steel Protective Casing
0	-	1	0-2	0.6	2 2 2 3	4	NA		Brown Sandy Organic SILT, trace Organics (Roots, Wood), tree Root in tip sample, damp.	N C N C N C N C N C N C N C N C N C N C
		2	2-4	1.0	2 2 2 2	4	NA		Dark orange-brown fine SAND, trace medium to coarse Sand, trace fine G trace Silt, damp.	Proposed bentonite grout to 8' bgs  Proposed doubl casing 0 to 9' bgs  Proposed 2" ID
5 ~	-5 -	3	4-6	0.6	2 3 3	6	NA			Type 304 Stainless Steel riser 2' ags to 1' bgs
		4	6-8	1.2	6 6 11 18	17	NA		Gray-brown fine to medium SAND, little coarse Sand, little fine to medium Gravel, trace Silt, damp.	
		5	8-10	1.2	10 20 12 9	32	NA		As above, moist to wet at bottom of sample.	Proposed bentonite seal 8 to 10' bgs
10 -10		6	10-12	1.3	5 3 3 5	6	NA	• • •	Orange-brown fine SAND, trace Silt, saturated.  Orange-brown fine to medium SAND, trace coarse Sand, trace fine to med Gravel, trace Silt, saturated.	ium
		7	12-14	1.0	4 5 7	12	NA		Orange-brown fine to coarse SAND, little fine to medium Gravel, trace Silt, saturated.	Proposed 2" ID Type 304 Stainless Steel 0.010" slotted screen 11 to 21'
15 -1!	5 -	8	14-16	1.3	16 12 7 5	19	NA		Gray-brown fine to medium SAND, little coarse Sand, trace fine Gravel, tra Silt, saturated.	Proposed grade #5 "Global Filter Pack" silica sand pack 10 to 21' bgs



Site Location:

Well/Boring ID: MW-09 Proposed

Borehole Depth: 26' bgs

Plainwell, Michigan

				_	_	_		_		
DEРТН	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
-	-		16-18	0.7	13 12 7	19	NA	0000	Gray-brown fine to medium SAND, little coarse Sand, trace fine Gravel, trace Silt, saturated.  Gray-brown coarse SAND and fine GRAVEL, trace fine to medium Sand, saturated.	
-20	-20 -	10	18-20	1.7	7 6 6 3 3	9	NA	0-	Gray-brown fine to medium SAND, little coarse Sand, trace fine to medium Gravel, loose, saturated.	
-	_	11	20-22	1.7	2 3 6 7	9	NA			
-		12	22-24	1.7	4 4 4 7	8	NA			
<b>-</b> 25 -	-25 —	13	24-26	1.2	2 2 2 4	4	NA			
-										
- 30	-30 -									
_ 30 -	-30 -									
35 -	-35 –									



Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Date Start/Finish: 11/11/2008 **Drilling Company: MATECO** 

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger Auger Size: 4.25" ID

Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: NA Easting: NA

Casing Elevation: NA

Borehole Depth: 16' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-10 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	-									Locking J-Plu Steel Protecti Casing
0	-	1	0-2	1.3	2 3 4 4	7	NA		Dark brown Organic SILT, trace fine Sand, trace Organics, damp.  Orange-brown fine to medium SAND, little coarse Sand, trace fine to medium Gravel, trace Silt, loose, damp.	Proposed bentonite group to 2.5' bgs  Proposed 2"   Type 304 Stainless Ster
	-	2	2-4	1.0	1 1/ 12"	1	NA	H I H	Gray-brown grading to dark gray Silty CLAY, trace Organics (highly degraded), damp.	riser 2' ags to bgs  Proposed bentonite sea 2.5 to 4.5' bgs
5	-5-	3	4-6	1.0	1 1 1 1	2	NA		Dark gray-brown fine SAND, trace to little Silt, trace Shells, saturated.	Proposed dou casing 0 to 4' bgs
		4	6-8	1.1	NA	NA	NA	00000	Light gray-brown Silty fine to medium GRAVEL, little fine to coarse Sand, loose, saturated. Light gray calcareous discoloration throughout.	
		5	8-10	0.4	7 5 13 8	18	NA	0000	As above, poor recovery due to coarse Gravel in tip of shoe.	Proposed gra
10	-10 -	6	10-12	0.8	7 4 4 7	8	NA	00000	Light gray-brown fine to medium GRAVEL, little fine to coarse Sand, trace Silt, saturated. Light gray calcareous Silt throughout.	#5 "Global Fil Pack" silica si pack 4.5 to 15 bgs
		7	12-14	0.9	4 5 7 9	12	NA	¥.	Dark gray-brown fine to coarse SAND, little fine to medium Gravel, trace Silt, loose, saturated.	Proposed 2"
15	-15 -	8	14-16	0.7	3 4 4 6	8	NA			Stainless Stet 0.010" slotted screen 5 to 18 bgs



Applicable/Available; AMSL = Above Mean Sea Level.

Date Start/Finish: 11/11/2008 **Drilling Company: MATECO** 

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger Auger Size: 4.25" ID

Rig Type: CME-55 Sampling Method: 2" x 2' Split Spoon

Northing: NA Easting: NA Casing Elevation: NA

Borehole Depth: 14' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-11 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	-									Locking J-Plug  Steel Protective Casing
0	-	1	0-2	1.3	2 3 5 9	8	NA		orak brown Organic SILT, trace Organics, damp.  Stray Silty CLAY, moist.  Irown fine to medium SAND, trace Shells, loose, moist.	Proposed bentonite grout (to 1.5 bgs Proposed 2" ID Type 304 Stainless Steel
		2	2-4	1.6	2 2 2	4	NA		Gray Silty CLAY, trace Organics, damp.  ight brown fine SAND, trace Silt, moist.  Park gray Silty CLAY, trace highly degraded Organics, odor, moist.	riser 2' ags to 4' bgs Proposed doubl casing 0 to 3' bgs Proposed
5	-5 <b>-</b>	3	4-6	0.7	1 1 1 1	2	NA		sray-brown fine to medium SAND, trace coarse Sand, trace Silt, trace Shells, aturated.	bentonite seal 1.5 to 3.5' bgs
		4	6-8	0.5	1 1 1 1	2	NA	A	s above, Little Silt.	
10 -	-10 -	5	8-10	0.6	3 3 4 6	7	NA	G	Gray-brown fine to medium SAND, trace coarse Sand, trace fine to medium bravel, trace light gray Silt in tip of sampler, trace Shells, loose, saturated.	Proposed grade #5 "Global Filte Pack" silica sar pack 35 to 14' bgs
	-	6	10-12	1.0	7 4 7 6	11	NA		eark gray-brown fine to coarse SAND, little fine Gravel, loose, saturated.	December 2" ID
		7	12-14	0.7	3 3 3	6	NA		eray-brown fine to coarse SAND, trace fine to medium Gravel, trace Silt, loose, aturated.	Proposed 2" ID Type 304 Stainless Steel 0.010" slotted screen 4 to 14' bgs
15 -	-15 —									



Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger Auger Size: 4.25" ID Rig Type: CME-55 Sampling Method: 2" x 2' Split Spoon Date Start/Finish: 11/10/2008 **Drilling Company: MATECO** 

Casing Elevation: NA Northing: NA Easting: NA

Borehole Depth: 14' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-12 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

Proposed bentonite grout 0 to 0.5' bgs Proposed double casing 0 to 2' bgs Proposed grade #5 "Global Filter Pack" silica sand pack 2.5 to 13' bgs Proposed 2" ID Type 304 Stainless Steel riser 2" ags to 3" bgs Proposed 2" ID Type 304 Stainless Steel 0.010" slotted screen 3 to 13' bgs Locking J-Plug Steel Protective Casing Proposed bentonite seal 0.5 to 2.5' bgs Construction Well/Boring loose, Gray-brown fine to medium SAND, trace coarse Sand, trace Silt, saturated, at 4: Trace Shells. Gray-brown fine to medium GRAVEL, trace fine Sand, trace Silt, saturated Olive-brown Silty fine to coarse SAND, little fine to medium Gravel, loose, saturated. Olive-brown fine to coarse SAND, little fine to medium Gravel, trace Silt, saturated. Gray fine to medium SAND, trace fine to medium Gravel, trace Silt, wet Light brown fine to medium SAND, trace Organics (Shells), trace Silt, Dark gray Organic SILT, trace Clay, trace highly degraded natural slight odor, wet. Dark brown Silty fine SAND, trace highly degraded Organics, wet Dark brown Organic SILT, trace fine Sand, trace Shells, wet. Stratigraphic Description Gray-brown fine SAND, trace Silt, trace Shells, wet Dark brown Organic SILT, trace fine Sand, damp. Dark gray Silty CLAY, moderately soft, Orange-brown Silty fine SAND, Dark gray Silty fine SAND, wet Saturated Geologic Column ¥ ¥ ¥ ¥ ¥ ¥ ¥ PID Headspace (ppm) 18 16 9 9 7 9 9ulsV - Value 9 Blow Counts 10 2 12 9 3 2 3 2 4 2 8 9 3 60 m 1.65 1.3 6.0 1.0 1.0 0.8 1.4 Recovery (feet) 10-12 12-14 8-10 0-2 4-6 8-9 24 Sample/Int/Type 2 9 1 2 3 4 Sample Run Number **ELEVATION** -15 15 **DEPTH** 



Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.



Date Start/Finish: 11/11/2008 Drilling Company: MATECO

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger

Auger Size: 4.25" ID Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: NA Easting: NA

Casing Elevation: NA

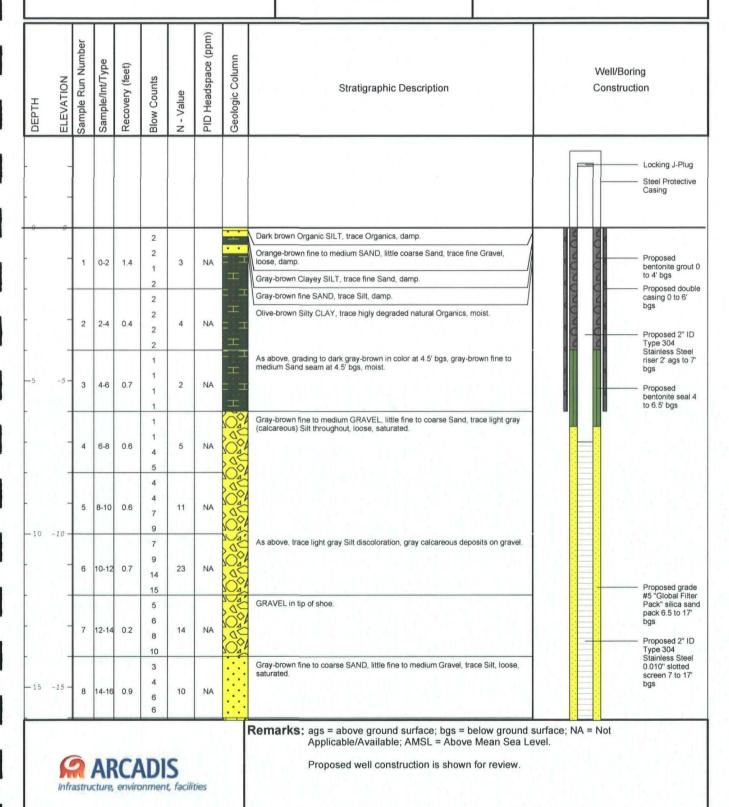
Borehole Depth: 18' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-13 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan



Site Location: Plainwell, Michigan Well/Boring ID: MW-13 Proposed

Borehole Depth: 18' bgs

ОЕРТН	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Well/Boring Stratigraphic Description Construction
	_	9	16-18	0.5	4 7 3 5	10	NA	00000000000000000000000000000000000000	Gray-brown fine to medium GRAVEL, little fine to coarse Sand, trace Silt, loose, saturated.
- 20	-20 -								
	-								
	-								
<del>-</del> 25	-25 <b>-</b>								
-	-								
- 30	-30 -								
	_								
-	_								
<del>-</del> 35	-35 <b>-</b>								Remarks: ags = above ground surface: bgs = below ground surface: NA = Not



Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Date Start/Finish: 11/10/2008 **Drilling Company: MATECO** 

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger

Auger Size: 4.25" ID Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: NA Easting: NA

Casing Elevation: NA

Borehole Depth: 16' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-14 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

ОЕРТН	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
-	-									Locking J-Plug  Steel Protective Casing
-	-	1	0-2	1.7	2 2 2 2	4	NA	== 完  ::	Dark brown SILT, trace fine Sand, trace Organics (Roots), damp.  Brown fine to medium SAND, trace Silt, loose, damp.  Light gray Clayey SILT, damp.	Proposed bentonite grout 0 to 2' bgs Proposed 2" ID Type 304 Stainless Steel
		2	2-4	1.3	1 1 1 1	2	NA		Dark brown Organic SILT, trace Organics (Roots), damp.  Dark brown Silty fine SAND, trace Organics (highly degraded), moist to wet. at 2': Wet.  Gray-brown fine SAND, trace medium to coarse Sand, trace Silt, wet.	riser 2' ags to 4.5' bgs  Proposed double casing 0 to 3' bgs  Proposed
<b>-</b> 5	-5 =	3	4-6	1.6	1 1 1 2	2	NA	== :::	Brown SILT, trace fine Sand, wet.  Light gray-brown fine SAND, little Silt, trace medium to coarse Sand, trace fine to medium Gravel, saturated. (Light gray SILT in Sand/Gravel matrix).	bentonite seal 2 to 4' bgs
-	-	4	6-8	1.0	4 4 4	8	NA		Gray-brown fine to coarse SAND, trace fine to medium Gravel, trace Silt, saturated.	
-10	-10 -	5	8-10	1.0	NA	NA	NA		As above, grading to dark gray at 8.7' bgs.	Proposed grade #5 "Global Filter Pack" silica sand pack 4 to 14.5"
	-	6	10-12	0.9	2 3 3 4	6	NA	000000	Dark gray fine to medium GRAVEL, little fine to coarse Sand, trace Silt, saturated.	bgs Proposed 2" ID
		7	12-14	1.0	2 3 3 4	6	NA	00000		Type 304 Stainless Steel 0.010" slotted screen 4.5 to 14.5' bgs
- 15	-15 <b>-</b>	8	14-16	0.7	3 3 3 5	6	NA	00000 0000		<u>-</u> .



Applicable/Available; AMSL = Above Mean Sea Level.

Date Start/Finish: 11/11/2008 **Drilling Company: MATECO** 

Driller's Name: Gary Swift, John Olson Drilling Method: Hollow Stem Auger Auger Size: 4.25" ID

Rig Type: CME-55

Sampling Method: 2" x 2' Split Spoon

Northing: NA Easting: NA

Casing Elevation: NA

Borehole Depth: 18' bgs Surface Elevation: NA

Descriptions By: Ron Kuhn

Well/Boring ID: MW-15 Proposed

Client: Kalamazoo River Study Group

Location: Plainwell, Michigan

DEРТН	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	-									Locking J-Plug  Steel Protective Casing
-0		1	0-2	1.5	1 2 2 3	4	NA	 	Dark brown Organic SILT, trace moderately degraded Organics, damp.  Gray-brown Clayey SILT, trace fine Sand, trace Organics, damp.  Orange-brown fine SAND, trace Silt, damp.	Proposed bentonite grout 0 to 2' bgs Proposed 2" ID Type 304 Stainless Steel
		2	2-4	0.9	2 2 2 3	4	NA		Orange fine SAND, trace Silt, trace medium Gravel, moist.	riser 2' ags to 5' bgs Proposed double casing 0 to 3' bgs Proposed bentonite seal 2
5 -	-5 -	3	4-6	0.5	1 2 3 3	5	NA		As above, Saturated.	to 4' bgs
		4	6-8	0.8	3 3 4 4	7	NA		Gray-brown fine to medium SAND, little coarse Sand, trace fine to medium Gravel, trace Silt, loose, saturated.	
10 -1		5	8-10	0.8	3 5 4 4	9	NA		Gray-brown fine to coarse SAND, little fine to medium Gravel, trace Silt, saturated.	Proposed grade #5 "Global Filter Pack" silica sanc
10 -1		6	10-12	1.2	3 4 4 7	8	NA			Pack' sliica sand pack 4 to 15' bgs
		7	12-14	0.6	3 6 4 4	10	NA		As above, grading to dark gray at 12.4' bgs.	Proposed 2" ID Type 304
·15 -1	.5 –	8	14-16	0.4	2 3 4	6	NA	100000 100000	Dark gray fine GRAVEL, little fine to coarse Sand, saturated.	Stainless Steel 0.010" slotted screen 5 to 15"
					D	_			Remarks: ags = above ground surface; bgs = below ground su	surface; NA = Not evel.
	1	1	AK	CF	DI	2		- 1	Proposed well construction is shown for review.	

Site Location: Plainwell, Michigan Well/Boring ID: MW-15 Proposed

Borehole Depth: 18' bgs

DEРТН	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		-			3				No recovery - slough,	
-	-	9	16-18	0.0	3	6	NA			
_			_		4					1 1 1
	_									
									100	
20	-20 -									Epc. Topic of the off
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-	_									
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-25	-25 -						11			
	100				1 1,					
						. "		da.		à by fing, bathr li
-									발생이 보고되는데 된 경에 있다니까	
-	111							li, i	얼마리 가라는 다리라는 것이 없다.	
<b>—</b> 30	-30 -						1, 13		교육하는 이렇게 아니라 맛있다. 나를 하다.	
	7,4				1.1,				ga yerkon dan jega we ter	
	11 1J						118			
						W.		i T		
-	-						r de d	· H	마음 마시에 이 병을 살았다.	
						1 16			[[[전문] [] [] [] [] [] [] [] [] [] [] [] [] []	and the same of the same of the
	ìı:				, 11		ù"		[종교화] : [12] [12] [12] [13] [14] [14]	
<del>-</del> 35	-35 <b>-</b>								매고 마른하다면 모든 10일 되는 이름이 되었다.	
_	1, 1									



Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.